WHAT IS CLAIMED IS:

1. A tunable dispersion compensation device comprising:

an optical waveguide having a grating;

a plurality of heaters arranged along an optical axis of said optical waveguide; and

a pulsed-current supplying means for producing a desired temperature distribution in said grating by supplying a plurality of pulsed currents to said plurality of heaters, respectively.

2. The tunable dispersion compensation device according to Claim 1, said grating is a chirped grating.

3. The tunable dispersion compensation device according to Claim 1, wherein said pulsed-current supplying means includes a pulse width control means for adjusting pulse widths of the plurality of pulsed currents supplied to said plurality of heaters, respectively, according to the desired temperature distribution to be produced in said grating.

4. The tunable dispersion compensation device according to Claim 3, wherein said pulsed-current supplying means supplies the plurality of pulsed currents to said plurality of heaters at different times, respectively.

5. The tunable dispersion compensation device according to Claim 3, wherein said pulsed-current supplying

means divides the plurality of pulsed currents into a plurality of groups and supplies pulsed currents included in different groups to corresponding heaters at different times, respectively.

6. The tunable dispersion compensation device according to Claim 1, wherein said pulsed-current supplying means includes a DC power supply, an EMI elimination filter for eliminating noise included in a DC output from said DC power supply, and a switching means for generating the plurality of pulsed currents from an output of said EMI elimination filter.

7. The tunable dispersion compensation device according to Claim 3, wherein the pulse widths of the plurality of pulsed currents supplied to said plurality of heaters, respectively are increased or decreased in order that said plurality of heaters respectively associated with the plurality of pulsed currents are arranged along the optical axis of said waveguide.

8. The tunable dispersion compensation device according to Claim 7, wherein the pulse widths of the plurality of pulsed currents are increased or decreased linearly.

9. The tunable dispersion compensation device according to Claim 8, wherein said pulse width control means includes a pulse width determining means for determining the pulse widths of the plurality of pulsed

currents based on an initial value and a pulse width increment.

10. The tunable dispersion compensation device according to Claim 9, wherein said pulse width control means includes a correction means for correcting the pulse widths of the plurality of pulsed currents determined by said pulse width determining means using a plurality of correction coefficients that are predetermined for said plurality of heaters, respectively.

11. The tunable dispersion compensation device according to Claim 7, wherein the pulse widths of the plurality of pulsed currents supplied to said plurality of heaters, respectively, are increased or decreased nonlinearly.

12. The tunable dispersion compensation device according to Claim 11, wherein said pulse width control means includes a pulse width determining means for determining the pulse widths of the plurality of pulsed currents based on an initial value, a pulse width increment, and a plurality of correction coefficients that are predetermined for said plurality of heaters, respectively.

13. The tunable dispersion compensation device according to Claim 4, wherein said pulsed-current supplying means includes a DC power supply, a switching means including a plurality of switches (referred to as first to n*th* switches from here on) each for generating a pulsed

current from a DC output from said DC power supply in response to a control pulse applied thereto, and a control pulse generation means for generating a control pulse to be supplied to the (i+1)*th* (i=1 to n-1) switch based on the pulsed current generated by the i*th* switch.

14. The tunable dispersion compensation device according to Claim 4, wherein said pulsed-current supplying means includes a DC power supply, a switching means including a plurality of switches (referred to as first to n*th* switches from here on) each for generating a pulsed current from a DC output from said DC power supply in response to a control pulse applied thereto, and a control pulse generation means for generating a control pulse to be supplied to the (i+1)*th* (i=1 to n-1) switch based on a pulse which is delayed by a predetermined time interval with respect to a control pulse supplied to the i*th* switch.

15. An optical receiver comprising:

a dispersion detector for detecting chromatic dispersion of an optical signal incident thereon, and for generating a control signal having a value corresponding to the detected chromatic dispersion;

a tunable dispersion compensation device including an optical waveguide having a grating, a plurality of heaters arranged along an optical axis of said optical waveguide, and a pulsed-current supplying means for producing a desired temperature distribution in said grating by supplying a plurality of pulsed currents to said plurality of heaters, respectively, according to the control signal

from said dispersion detector; and

an optical circulator for guiding the optical signal with chromatic dispersion to be compensated for to said dispersion compensation device, and for guiding the optical signal compensated by said dispersion compensation device to said dispersion detector.

16. The optical receiver according to Claim 15, wherein said pulsed-current supplying means of said tunable dispersion compensation device includes a pulse width control means for adjusting pulse widths of the plurality of pulsed currents supplied to said plurality of heaters, respectively, according to the desired temperature distribution to be produced in said grating.

17. The optical receiver according to Claim 16, wherein said pulsed-current supplying means of said tunable dispersion compensation device supplies the plurality of pulsed currents to said plurality of heaters at different times, respectively.

18. An optical fiber communication system including an optical transmitter for multiplexing a plurality of optical signals having different wavelengths, an optical fiber transmission line via which the plurality of optical signals multiplexed by said optical transmitter are transmitted, an optical receiver for demultiplexing the plurality of optical signals multiplexed and received via said optical fiber transmission line and for demodulating information that the plurality of optical signals carry,

and a tunable dispersion compensation means for compensating for chromatic dispersion of each of the plurality of said optical signals transmitted via said optical fiber transmission line, said optical tunable dispersion compensation means comprising:

at least a tunable dispersion compensation device including an optical waveguide having a grating, a plurality of heaters arranged along an optical axis of said optical waveguide, and a pulsed-current supplying means for producing a desired temperature distribution in said grating by supplying a plurality of pulsed currents to said plurality of heaters, respectively.

19. The optical fiber communication system according to Claim 18, further comprising a static dispersion compensation means coupled to said optical fiber transmission line, for compensating for a different, fixed amount of chromatic dispersion of each of the plurality of optical signals transmitted via said optical fiber transmission line.

20. The optical fiber communication system according to Claim 18, wherein said optical tunable dispersion compensation means includes a plurality of optical receiving means disposed in said optical receiver, each for compensating for chromatic dispersion of a corresponding one of the plurality of optical signals demultiplexed, and each of said plurality of optical receiving means comprises a dispersion detector for detecting chromatic dispersion of a corresponding one of the plurality of optical signals,

and for generating a control signal having a value corresponding to the detected chromatic dispersion, a tunable dispersion compensation device including an optical waveguide having a grating, a plurality of heaters arranged along an optical axis of said optical waveguide, and a pulsed-current supplying means for producing a desired temperature distribution in said grating by supplying a plurality of pulsed currents to said plurality of heaters, respectively, according to the control signal from said dispersion detector, and an optical circulator for guiding the optical signal with chromatic dispersion to be compensated for to said tunable dispersion compensation device, and for guiding the optical signal compensated by said tunable dispersion compensation device to said dispersion detector.

21. The optical fiber communication system according to Claim 18, wherein said pulsed-current supplying means of said tunable dispersion compensation device has a pulse width control means for adjusting pulse widths of the plurality of pulsed currents supplied to said plurality of heaters, respectively, according to the desired temperature distribution to be produced in said grating.

22. The optical fiber communication system according to Claim 21, wherein said pulsed-current supplying means supplies the plurality of pulsed currents to said plurality of heaters at different times, respectively.

23. A method of compensating for chromatic dispersion

of an optical signal by using an optical waveguide having a grating, said method comprising the step of:

producing a desired temperature distribution in said grating by supplying a plurality of pulsed currents to a plurality of heaters, respectively, said plurality of heaters being arranged along an optical axis of said optical waveguide.

24. The method according to Claim 23, further comprising the steps of: detecting chromatic dispersion of the optical signal, generating a control signal having a value corresponding to the detected chromatic dispersion, and supplying a plurality of pulsed currents to said plurality of heaters, respectively, according to the control signal.